United States Patent [19]

Milkovich et al.

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[54] **PROCESS FOR PREPARING COPOLYMERIZABLE MACROMOLECULAR MONOMERS HAVING A SUBSTANTIALLY UNIFORM MOLECULAR WEIGHT DISTRIBUTION**

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Related U.S. Application Data

[60] Division of Ser. No. 282,099, Aug. 21, 1972, Pat. No. 3,786,116, which is a continuation-in-part of Ser. No. 244,205, April 14, 1972, Pat. No. 3,832,423, which is a continuation-in-part of Ser. No. 117,733, Feb. 22, 1971, abandoned.

[52] **U.S. Cl.**..... **260/93.5 A,** 260/88.3 R, 260/89.1, 260/89.5 S, 260/89.7 S, 260/91.1 S, 260/93.7, 260/94.7 R, 260/94.7 A, 260/94.8, 260/94.9 GO, 260/96 R, 260/823, 260/827, 260/835, 260/836, 260/837 R, 260/851, 260/859 R, 260/874, 260/875, 260/876 R, 260/877, 260/878 R, 260/879, 260/881, 260/884, 260/885, 260/886, 260/887

[51] **Int. Cl.**..... **C08f 29/12,** C08f 29/50

[58] **Field of Search**.. 260/93.5 A, 94.7 A, 94.7 HA, 260/884, 886, 879, 887, 874

[56] **References Cited**

UNITED STATES PATENTS

3,050,511	8/1962	Szevasc	260/93.5
3,175,997	3/1965	Hsieh	260/85.1
3,235,626	2/1966	Waack	260/886
3,598,799	8/1971	Naylor	260/876
3,607,846	9/1971	Halasa	260/94.7
3,786,116	1/1974	Milkovich	260/93.5

OTHER PUBLICATIONS

Greber - Die Makromolekulare Chemie 101 - (1967) pp. 104-144.

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[57] **ABSTRACT**

This application discloses a process for preparing a copolymerizable macromolecular monomer comprising (a) polymerizing a vinyl-containing compound in the presence of an alkali metal hydrocarbyl anionic polymerization initiator to produce a monofunctional living polymer, (b) reacting said monofunctional living polymer with an alkylene oxide capping agent having eight or fewer carbon atoms to obtain a monofunctional alkoxide anion terminated macromolecular monomer, and (c) reacting said monofunctional alkoxide terminated macromolecular monomer with a halogen-containing compound which also contains a polymerizable moiety, said halogen-containing compound being a member selected from the group consisting of acrylyl halide, methacrylyl halide, vinyl-2-haloethyl ether, vinyl haloacetate, halomethylmaleic anhydride and its esters, allyl halide, methallyl halide, epihalohydrin, and vinylbenzyl halide to produce said macromolecular monomer having a copolymerizable end group, said copolymerizable macromolecular monomer being further characterized as having a substantially uniform molecular weight distribution such that its ratio of $\overline{M}w/\overline{M}n$ is less than about 1.1, wherein $\overline{M}w$ is the weight average molecular weight of the macromolecular monomer and $\overline{M}n$ is the number average molecular weight of the macromolecular monomer.

13 Claims, No Drawings